REMARKS

The above amendments and the below remarks are responsive to the Office Action, dated June 29, 2005, entered in the above referenced pending application. The pending claims are 12-21.

Each of the Examiner's rejections are addressed separately below.

Information Disclosure Statement

A supplemental Information Disclosure Statement is being filed concurrently herewith to include the month and year of the publications indicated by the Examiner as not being considered.

Rejections under 35 U.S.C. § 103

1. WO 01/41512 and Polymer Preprints 41(1), 2000, pp. 770-771

Claims 13-15 and 17-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over WO 01/41512 ("*Thompson*") in view of the article by Djurovich et al., Polymer Preprints 41(1), 2000, pp. 770-771 ("*Djurovich*"). Applicants respectfully traverse this rejection

Claims 13-15 and 17 (compound claims) and 18-20 (device claims)

It is respectfully submitted that *Thompson* does not teach or suggest compounds having the specific compounds of Claims 13-15 and 17-21. While *Thompson* discloses devices having an emitting layer comprising a compound L_2MX, where L and X are bidentate ligands and M is an octahedral metal, such as iridium and further discloses that the L ligand can have a phenyisoquinoline structure, which is labelled as "arylquinoline", in Figure 39, such is not a teaching or suggestion of the pending subject matter. In particular, *Thompson* does not teach or suggest compounds having the specific phenylisoquinoline ligands recited in Applicants' Claims 13-15 and 17-19. *Thompson* indicates the possibility of substituents on the aromatic rings of the "arylquinoline" ligand in Figure 39. However, there is no teaching or suggestion of what these substituents could or should be.

Djurovich does not complete the deficiencies of the *Thompson* reference. *Djurovich* teaches only one compound, an iridium complex having three phenylpyridine ligands, substituted with fluorine ("FIrppy"). The Examiner further stated that it would have been obvious to use the fluorine of FIrppy as the substituents on the "arylquinoline" ligand of *Thompson* in order to improve the solubility. Applicants respectfully disagree with this assessment. The ligand of the *Djurovich* complex is a phenylpyridine, not a phenylquinoline or phenylisoquinoline. While *Djurovich* indicates that the substitution of fluorines on the phenylpyridine ligand increases the solubility of the complex in organic solvents, the

reference also indicates that the emission efficiency is decreased. *See Djurovich* at paragraph bridging pages 770 and 771. It is respectfully submitted that one of ordinary skill reading *Djurovich* would not have chosen fluorine as a substituent on a phenylisoquinoline ligand. The Examiner noted that *Thompson* and *Djurovich* are common inventor/authors on the two references. Applicants submit that the common inventership/authorship is evidence that the combining of *Thompson* and *Djurovich* actually teaches away from the subject matter of Claims 13-15 and 17. Specifically, the *Thompson* reference teaches away from use of fluorine substituents. Since both *Thompson* and *Djurovich* were aware of fluorine as a possible substituent in the world of general chemistry, if it was in any way of interest to them, such a substituent would have mentioned it if it were suitable for the "arylquinoline" ligand of *Thompson*. The failure to list fluorine as a substituent is an indication to one of ordinary skill against its use. Furthermore, neither reference teaches or suggests trifluoromethyl substituents on any type of ligand.

The specific compounds are neither taught nor suggested and thusly, their use in an electronic device (Claims 18-20) is neither taught nor suggested.

Applicants respectfully request that this rejection be withdrawn with respect to Claims 13-15 and 18-20.

Claim 21

The Examiner stated that it would have been obvious to use greater than 20% by weight of the iridium complex in the light-emitting layer of *Thompson* in order to increase the total amount of light emitted. Applicants respectfully disagree with this conclusion. *Thompson* does not teach a range of concentrations for an iridium complex in a light-emitting layer. *Thompson* discloses one data point: a device in which the light-emitting layer is 12% by weight bis(2-phenylbenzothiazole)iridium acetylacetonate ("BTIr") in 4,4'-N,N'-dicarbazole-biphenyl. The BTIr complex does not have a ligand with Applicants' structure (XI) or (XII) as recited in Claim 26. *Djurovich* teaches that devices with maximum efficiency are obtained with FIrppy concentrations in the range of 2.5-3.5 wt%. (*see* last paragraph on page 771) Again, the FIrppy complex does not have a ligand with Applicants' structure (XI) or (XII) as recited in Claim 21, nor does it have the ligand in the BTIr complex of *Thomson*. The *Thompson* and *Djurovich* references taken individully or collectively do not teach any concentration range for iridium complexes having a ligand with Applicants' structure (XI) or (XII), as recited in Claim 21. If anything, the combined references teach that the concentration of an iridium complex in a light-emitting layer should be 12 wt% or lower.

Applicants respectfully request that this rejection be withdrawn with respect to Claim 21.

2. WO 01/41512; Inorganic Chemistry, Vol. 30, 1991, 1685-1687; and

WO 00/70655

Claims 12-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over WO 01/41512 ("*Thompson*") in view of the Dedeian et al. article Inorganic Chemistry, Vol. 30, 1991, 1685-1687 ("*Dedeian*") and WO 00/70655 ("*Baldo*"). Applicants respectfully traverse this rejection.

Claims 12-17

As noted above, *Thompson* does not teach or suggest compounds having the specific phenylisoquinoline ligands recited in Applicants' Claims 12-17. *Thompson* indicates the possibility of substituents on the aromatic rings of the "arylquinoline" ligand in Figure 39. However, there is no teaching as to what these substituents could or should be. *Thompson* teaches in the paragraph bridging pages 34 and 35, that in L_2MX complexes, the X ligand can, in some cases, affect the energy of emission and efficiency. There is no suggestion that substituents on the L ligand can be used to tune the color.

The Examiner has pointed to *Dedeian* to provide the substituents for the complexes of *Thompson*. *Dedeian* discloses iridium complexes having three substituted 2-phenylpyridine ligands ("tris complexes") as strong photoreducing agents. The complexes of *Dedeian* have substituents on the phenyl group in the phenylpyridine ligand, *i.e.*, 4-fluorophenyl and 4-trifluoromethylphenyl. (*see* Table I at the top of page 1686) There is no suggestion in *Dedeian* to use such substituents in any system other than a tris complex with phenylpyridine. The Examiner has further pointed out that the *Thompson* and *Dedeian* references share a common author. Applicants submit that because of this, the *Thompson* reference teaches away from trifluoromethyl substituents. Since the inventors in *Thompson* were aware of trifluoromethyl as a substituent, they surely would have mentioned it if it were suitable for the phenylisoquinoline ligands of *Thompson*. The failure to list fluoroalkyl or trifluoromethyl as a substituent is an indication against its use.

The addition of the teachings of the *Baldo* reference does not overcome the deficiency. *Baldo* discloses tris complexes with phenylpyridine ligands ("$Ir(ppy)_3$")and teaches that substituents on either ring can be alkyl or aryl. No substituted ligands are exemplified. The teaching of *Baldo* on pages 14 and 15, refers to the different properties of tris complexes with different ligands, *i.e.*, phenylpyridine, phenylpyrimidine, and bipyridine ligands. There is no suggestion of other ligands, and certainly no suggestion of other substituted ligands. Based on the combined teachings of *Thompson*, *Dedeian*, and *Baldo*, and absent Applicants' teaching, one of ordinary skill in the art would not know to use fluoro or trifluoromethyl substituents on a phenylisoquinoline ligand and arrive at the compounds recited in Claims 12-17.

Applicants respectfully request that the rejection be withdrawn with respect to Claims 12-17.

Claims 18-20

With respect to Claims 18-20, Applicants respectfully submit that electronic devices comprising the compounds of Claims 12-17 are not taught or suggested by *Thompson*, *Dedeian*, and *Baldo*, for all the reasons enumerated above.

Applicants respectfully request that the rejection be withdrawn with respect to Claims 18-20.

Claim 21

As noted above, *Thompson* does not teach a range of concentrations for an iridium complex in a light-emitting layer. *Thompson* discloses one data point: a device in which the light-emitting layer is 12% by weight bis(2-phenylbenzothiazole)iridium acetylacetonate ("BTIr") in 4,4'-N,N'-dicarbazole-biphenyl. The BTIr complex does not have a ligand with Applicants' structure (XI) or (XII) as recited in Claim 26. *Dedeian* relates to the use of the

iridium complexes as photoreducing agents and does not discuss electronic devices at all. *Baldo* teaches in Figure 2 that with iridium complexes having three phenylpyridine ligands, the efficiency of devices drops dramatically when the emitting layer has more than 6% $Ir(ppy)_3$. The *Thompson*, *Dedeian*, and *Baldo* references taken individully or collectively do not teach any concentration range for iridium complexes having a ligand with Applicants' structure (XI) or (XII), as recited in Claim 21. If anything, the combined references teach that the concentration of an iridium complex in a light-emitting layer should be 12 wt% or lower.

Applicants respectfully request that this rejection be withdrawn with respect to Claim 21.

Conclusion

In view of the foregoing remarks, Applicants respectfully submit that the above referenced pending application is in condition for allowance. A Notice of Allowance for Claims 12-21 is therefore earnestly solicited.

Respectfully submitted,

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Dated: 9/29/2005

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF:

VLADIMIR GRUSHIN ET. AL.

CASE NO.: PE0649 US DIV2 APPLICATION NO.: 10/696,349

CONFIRMATION NO.: 6624 GROUP ART UNIT: 2813

EXAMINER: ERIK J. KIELIN FILED: October 29, 2003

FOR: ELECTROLUMINESCENT IRIDIUM COMPOUNDS WITH FLUORINATED PHENYLPYRIDINES, PHENYLYRIMIDENES, AND PHENYLQUINOLINES AND DEVICES MADE WITH SUCH COMPOUNDS

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants file this Supplemental Information Disclosure Statement to provide the month and year of the non-patent document publications. The documents were previously provided. Enclosed is the PTO/SB/08B.

Should any to fee be required in connection with the filing of this Information Disclosure Statement please charge such fee to Deposit Account No. **04-1928** (E. I. du Pont de Nemours and Company).

Respectfully submitted,

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Dated: 9/29/2005
Enclosures

PTO/SB/08B (05-03)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/696,348
Filing Date	October 29, 2003
First Named Inventor	VLADIMIR GRUSHIN ET. AL.
Group Art Unit	2813
Examiner Name	UNKNOWN
Attorney Docket Number	PE0549USDIV2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		LAMANSKY, SERGEY ET AL., Highly Phosphorescent Bis-Cyclometalated Iridium Complexes: Synthesis, Photophysical Characterization, and Use in Organic Light Emitting Diodes, J. Am. Chem. Soc., 04/13/2001, 4304-4312, 123, American Chemical society	☐
		LAMANSKY, SERGEY ET AL., Synthesis and Characterization of Phosphorescent Cyclometalated Iridium Complexes, Inorg. Chem. 03/01/2001, 1704-1711, 40, American Chemical Society	☐
		LAMANSKY, SERGEY ET AL., Molecularly doped polymer light emitting diodes utilizing phosphorescent Pt(II) and IR(III) dopants, Organic Electronics. March 2001. 53-62, 2, Elsevier Science B.V.	☐
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Examiner Signature		Date Considered	

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[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached.